ARIZONA TRANSPORTATION RESEARCH CENTER

RESEARCH NOTES:

Project 486

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Highway Facilities for an Aging Arizona Population

Background

The state of Arizona, like the nation as a whole, has an increasing number of residents over the age of 65. Nationwide, the largest increase in licensed drivers is occurring in the over 85 population, and, by 2030, older drivers are expected to account for 18.9% of all vehicle miles driven, compared to 6.7% in 1990. The Arizona Department of Transportation (ADOT) recognized that with this growth comes a host of issues related to older drivers and that, while there was a vast literature related to these issues, there was need to assess current research and, based on findings, recommend actions that should be taken to improve driving safety for older adults.

Analysis of Collision Data

Data were extracted from an Access database and linked at the person and accident levels. Analysis was primarily conducted at the driver level, with linked accident-level data used where appropriate. Drivers with reported ages younger than 16 or older than 101 were dropped from the analysis. For comparison purposes, drivers were grouped into three age categories:

- Under 25.
- 25 to 64.
- 65 and over.

Older drivers in Arizona were more apt to have angle and left-turn collisions and less apt to have rear-end collisions than are younger drivers.

Collision Type by Age Cohort[1]

	25-64	65+
Angle	20.4%	27.8%
Left Turn	11.6%	15.0%
Rear-End	47.8%	35.7%
Other	20.2%	21.5%

Accidents were more likely to occur in daylight driving conditions for older drivers than their younger counterparts. This reflects the pattern that older drivers conduct a larger share of their driving during daylight hours than do younger drivers. The

[1] Single vehicle accidents were excluded from this analysis.

pattern was similar for older drivers in Washington and Oregon.

In comparison to younger drivers, a higher percentage of accidents involving older divers occurred in rural locales. (Table 3.5). Similarly, intersections and junctions were more likely to be involved in an accident for an older driver than for a younger driver. This difference becomes more pronounced as age increases.

An accident involving an older driver is almost 50% more likely to result in a fatality (0.57% versus 0.83%). This is in line with the 0.6% fatality rate in accidents involving older drivers for Oregon State between 1999 and 2001 and lower than the 0.97% reported for Washington State for the same period. As age increases, this trend becomes more pronounced.

The older drivers analyzed here, and the difference between the older adults and younger drivers, are consistent with the literature reviewed and with the characteristics of the drivers and collisions found in both the Washington and Oregon data for the same time period. Our data show that older drivers are significantly more likely than are younger drivers to:

- Have angle and left-turn collisions and less apt to have rear-end collisions.
- Be involved in accidents in daylight driving conditions and in rural areas.
- Be in accidents involving intersections and junctions, stop signs or signals, and raised medians.
- Suffer fatal injuries in an accident.
- We found no difference in collision patterns by age group for accidents involving inclement weather conditions.

Survey of Older Drivers

Given the available budget, a random sample of older citizens was not feasible. Quantec worked with the Region One Area Agency on Aging (AAA) in Maricopa County to distribute the survey in key senior centers. The center directors were to administer to those who volunteered to complete the survey and return them as a batch to the AAA, identifying their center with their returns. A total of 126 surveys were returned; however, 12 of these were mailed and we could not discern the center from which they came. Of the total returned, 121 were complete and used in the analysis. We acknowledge the limitations of this sample. Senior centers reach a unique sector of the older adult population. In distributing to a variety of senior centers, however, we were able to include English- and Spanish-speaking, urban, suburban, and semi-rural respondents.

The findings from the older drivers surveyed are consistent with the literature. Our data indicate that older Arizona drivers:

- Are very concerned about older drivers on the road.
- Most often rate driving at night as "very difficult," as well as driving on a freeway and identifying street names.
- Feel improvement could be made on many aspects of Arizona roadways, with lettering for signs most frequently rated as "not very good," followed by intersection markings and signals and availability of sidewalks.
- Most frequently rate larger and better-illuminated traffic signs as the most helpful design improvement.
- Most frequently rate special senior driver testing programs" as most the

most effective screening and assessment option.

- Most frequently rate changing the timing of traffic signals to allow more time for the walk cycle as most helpful action for pedestrians.

Recommendations

Three priority areas for roadway modification are recommended. Given budget constraints, the need to gradually phase in changes as new projects are undertaken or older roadway attributes retrofitted, the following should receive priority:

- Modification of left-turn phase indicators.
- Larger and better illuminated signs and devices for lane assignment on intersection approach.
- Improved signage, both in size, lighting, and contrast, and advance distance notification of required tasks (e.g., merge, on-ramp, exits, four-way stops) on all roadways.
- Pedestrian crossing-design improvements, including increased timing at crosswalks, median refuge islands, more frequent pedestrian opportunities, and placards explaining pedestrian control signals.

Table 4.8 Rating of Difficulty of Driving Tasks

Task	Very Difficult		Somewhat Difficult		Not at all Difficult		Total
	Freq.	%	Freq.	%	Freq.	%	
Driving in the Rain	16	14%	51	44%	49	42%	116
Driving in High-Density Traffic	19	17%	52	47%	40	36%	111
Driving at Night	34	30%	45	40%	34	30%	113
Parallel Parking	21	19%	32	29%	59	53%	112
Changing Lanes	6	5%	30	27%	76	68%	112
Passing Other Cars	7	6%	23	21%	82	73%	112
Merging into Freeway when no Separate Entrance Lane is Provided	16	13%	63	53%	40	34%	119
Driving on a Freeway	25	22%	30	26%	60	52%	115
Negotiating Curves	7	6%	15	14%	88	80%	110
Backing out of a Parking Space or Driveway	11	9%	24	21%	81	70%	116
Making Left-Hand Turns at Intersections without Left-Turn Signal	18	16%	41	36%	55	48%	114
Driving in Parking Lots	9	8%	20	17%	87	75%	116
Identifying Street Names	23	20%	35	30%	57	50%	115

Table 4.9 Rating of Arizona Roadways

Item	Very Good		Use Improvement		Not Very Good		Total
	Freq.	%	Freq.	%	Freq.	%	
Lighting for Signs	23	19%	20	17%	76	64%	119
Size of Lettering for Signs	34	29%	32	27%	52	44%	118
Intersection Markings and Signals	35	30%	12	10%	71	60%	118
Distance of Freeway On-Ramps	46	40%	12	11%	56	49%	114
Road Edge Markings	38	32%	32	27%	47	40%	117
Pedestrian Crosswalks and Signals	39	33%	32	27%	48	40%	119
Sidewalks Available	29	25%	24	21%	62	54%	115

Table 4.10 Rating of Helpfulness of Roadway Design Options

	Very Helpful		Somewhat Helpful		Not at all Helpful		Total
	Freq.	%	Freq.	%	Freq.	%	
Larger and Better Illuminated Traffic Signs	87	73%	30	25%	2	2%	119
Consistent Naming for Streets and Routes	90	77%	21	18%	6	5%	117
Reflective Signs and Road-Edge Markings	96	83%	16	14%	4	3%	116
Dedicated Lanes and Turn Signals for Left Turns	91	79%	19	17%	5	4%	115
Special Driving Routes and Travel Corridors for Older Adults	47	42%	39	35%	27	24%	113
Traffic Circles or Round-Abouts	41	39%	31	29%	34	32%	106

Table 4.11. Most Helpful of Highway Design Options

Design Option	Freq.	%
Consistent Naming for Streets and Routes	12	14%
Dedicated Lanes and Turn Signals for Left Turns	18	20%
Larger and Better Illuminated Traffic Signs	30	34%
Reflective Signs and Road Edge Markings	15	17%
Special Driving Routes and Travel Corridors for Older Drivers	10	11%
Traffic Circles or Round-Abouts	3	3%
Total	***88***	***100%***

The full report: *Highway Facilities for An Aging Arizona Population* by Sharon A. Baggett, PhD, Quantec, LLC6229 SE Milwaukie Ave., Portland, OR 97211 (Arizona Department of Transportation, report number FHWA-AZ-03-486, published June 2003) is available from the Arizona Transportation Research Center, 206 S. 17 Ave., mail drop 075R, Phoenix, AZ 85007; phone 602-712-3138 and on ADOT's web page www.dot.state.az.us